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AMENDMENT TRANSMITTAL **PATENT**

Application No.: 09/828,067
Filing Date: April 6, 2001
First Named Inventor Don Curry et al.
Examiner's Name: Zervigon, Rudy
Art Unit: 1763
Attorney Docket No.: 005040/TCG/PMD/LE

____ An Amendment After Final Action (37 CFR 1.116) is attached and applicant(s) request expedited action.
__X__ Charge any fee not covered by any check submitted to Deposit Account No. 02-2666.
__X__ Applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 CFR 1.16 and 1.17, for any concurrent or future reply to Deposit Account No. 02-2666.
____ Applicant(s) claim small entity status (37 CFR 1.27).

ATTACHMENTS

____ Preliminary Amendment
____ Amendment/Response with respect to Office Action
____ Amendment/Response After Final Action (37 CFR 1.116) (reminder: consider filing a Notice of Appeal)
____ Notice of Appeal
____ RCE (Request for Continued Examination)
____ Supplemental Declaration
____ Terminal Disclaimer (reminder: if executed by an attorney, the attorney must be properly of record)
____ Information Disclosure Statement (IDS)
____ Copies of IDS citations
____ Petition for Extension of Time
____ Fee Transmittal Document (that includes a fee calculation based on the type and number of claims)
____ Cross-Reference to Related Application(s)
____ Certified Copy of Priority Document
__X__ Other: Reply Brief Under 37 C.F.R. 41.41
____ Other: _____
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SUBMITTED BY:

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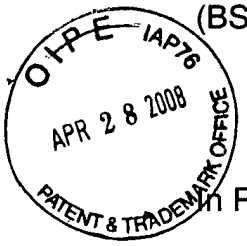
PATENT



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:

Don Curry et al.

Application No.: 09/828,067

Filed: April 6, 2001

For: WAFER PROCESSING APPARATUS HAVING A CHAMBER WITH AN UPPER WALL HAVING GAS SUPPLY OPENINGS FORMED THEREIN WHICH PROMOTE MORE EVEN PROCESING OF A WAFER

Examiner: Zervigon, Rudy

Art Unit: 1763

Confirmation No: 7268

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REPLY BRIEF UNDER 37 C.F.R. § 41.41

This is a reply to the Board of Patent Appeals and Interferences from the Examiner's Answer mailed on February 25, 2008 in regard to the above-identified application.

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I. REAL PARTY IN INTEREST

The real party in interest and assignee of record is Applied Materials, Inc., a corporation of Delaware having a principle place of business at 3050 Bowers Avenue, Santa Clara, California 95054.

II. RELATED APPEALS AND INTERFERENCES

To the best of Appellant's knowledge, there are no appeals or interferences related to the present appeal that will directly affect, be directly affected by, or have a bearing on the Board's decision in the instant appeal.

III. STATUS OF THE CLAIMS

Claims 29-35 and 38-57 are pending in the present application.

Claims 1-28 and 36-37 have been canceled.

Claims 29-35 and 38-57 have been finally rejected under 35 U.S.C. 103(a) in an Office Action mailed May 14, 2007.

Claims 29, 40, 42, and 47 are the subject of this appeal. A copy of Claims 29, 40, 42, and 47 as they stand on appeal are set forth in Appendix A.

IV. STATUS OF AMENDMENTS

No amendments have been submitted subsequent to the Final Office Action mailed May 14, 2007.

V. SUMMARY OF CLAIMED SUBJECT MATTER

This section of this Reply Brief is set forth to comply with the requirements of 37 C.F.R. 41.37(c)(1)(v) and is not intended to limit the scope of the claims in any way. Exemplary implementations of the limitations of independent claims 29, 42, and 47, and dependent claim 40 are described below.

Appellant's invention, as claimed in claims 29, 40, 42, and 47, is directed to an apparatus for processing wafers, such as those used in the semiconductor industry, paragraph [0001].

Independent claim 29 is related to a wafer processing apparatus, paragraph [0001]. The processing apparatus 10 comprises a processing chamber 12, a manifold component 18, processing gas supply line 20, and an exhaust line 22 (FIG. 3, paragraph [0020]). The processing gas supply line 20 is connected to the manifold component 18 for providing a processing gas comprising reactive gases into a manifold cavity 60 (FIG. 3, paragraph [0024]). As discussed in paragraph [0002] of the Background section, processing gas flows though the supply line 20. Exhaust line 22 is connected to the processing chamber 12 for flowing an exhaust gas from the processing chamber 12 (FIG. 3, paragraph [0024]). The particular configuration of the wafer processing apparatus creates a flow pattern of the processing gas over a wafer 74 and toward the exhaust line 22 that promotes even processing over the upper surface of the wafer (Abstract, paragraphs [0006] and [0007]).

The processing chamber 12 is partially defined by an upper wall 32 (FIG. 3, paragraphs [0005] and [0021]). Additionally, a susceptor 14 is in the processing chamber 12, and a wafer supply opening 40 is formed in one of the chamber walls for transferring a wafer into the chamber 12 and on the susceptor 14 (FIG. 3, paragraph [0021])). A manifold component 18 (FIG. 10) located on the processing chamber 12 together with the upper surface 46 of the upper wall 32 of the processing chamber 12 defines the manifold cavity 60 (FIG. 3, paragraphs [0005] and [0023]).

The upper wall 32 of the processing chamber 12 comprises a plurality of

processing gas supply openings 42 (FIG. 3, paragraph [0022]) which provide a pathway for flowing the processing gas from the manifold cavity 60 and into the processing chamber 12, paragraph [0024]. The processing gas supply openings 42 (242 in FIG. 10) are non-uniformly distributed over the upper wall 32 (232 in FIG. 10), paragraph [0007]. The non-uniformly distributed processing gas supply openings 242 create a predominantly vertical flow of processing gas onto the wafer 274 (FIG. 10, paragraph [0035]).

In dependent claim 40, the processing gas in the manifold cavity 60 comprises non-depleted reactive gases used for processing the wafer 74. As discussed in paragraph [0002] of the Background section, processing gases flow though the supply line 20.

Independent claim 42 is related to a wafer processing apparatus, paragraph [0001]. The processing apparatus 10 comprises a processing chamber 12, a manifold component 18, processing gas supply line 20, and an exhaust line 22 (FIG. 3, paragraph [0020]). The processing gas supply line 20 is connected to the manifold component 18 for providing a processing gas comprising non-depleted reactive gases into a manifold cavity 60 (FIG. 3, paragraph [0024]). As discussed in paragraph [0002] of the Background section, processing gas flows though the supply line 20.

Exhaust line 22 is connected to the processing chamber 12 for flowing an exhaust gas from the processing chamber 12 (FIG. 3, paragraph [0024]). The particular configuration of the wafer processing apparatus creates a flow pattern of the processing gas over a wafer 74 and toward the exhaust line 22 that promotes even processing over the upper surface of the wafer (Abstract, paragraphs [0006] and [0007]).

The processing chamber 12 is partially defined by an upper wall 32 (FIG. 3, paragraphs [0005] and [0021]). Additionally, a susceptor 14 is in the processing chamber 12, and a wafer supply opening 40 is formed in one of the

chamber walls for transferring a wafer into the chamber 12 and on the susceptor 14 (FIG. 3, paragraph [0021])). A manifold component 18 (FIG. 10) located on the processing chamber 12 together with the upper surface 46 of the upper wall 32 of the processing chamber 12 defines the manifold cavity 60 (FIG. 3, paragraphs [0005] and [0023]).

The upper wall 32 of the processing chamber 12 comprises a plurality of processing gas supply openings 42 (FIG. 3, paragraph [0022]) which provide a pathway for flowing the processing gas from the manifold cavity 60 and into the processing chamber 12, paragraph [0024]. The processing gas supply openings 42 (242 in FIG. 10) are non-uniformly distributed over the upper wall 32 (232 in FIG. 10), paragraph [0007]. The flow pattern of processing gas onto the upper surface of the wafer 274 is predominantly determined by the non-uniformly distributed processing gas supply openings 242, manifold cavity 60 and component 18, processing gas supply 20, and exhaust system comprising an exhaust line 122. (FIG. 10, see paragraph [0029] describing how gas is drawn into the manifold cavity 60, and paragraph [0035] describing flow pattern onto the wafer 274).

Independent claim 47 is related to a wafer processing apparatus, paragraph [0001]. The processing apparatus 10 comprises a processing chamber 12, a manifold component 18, processing gas supply line 20, and an exhaust line 22 (FIG. 3, paragraph [0020]). The processing gas supply line 20 is connected to the manifold component 18 for providing a processing gas comprising reactive gases into a manifold cavity 60 (FIG. 3, paragraph [0024]). As discussed in paragraph [0002] of the Background section, processing gas flows though the supply line 20. Exhaust line 22 is connected to the processing chamber 12 for flowing an exhaust gas comprising reacted gases and depleted processing gas from the processing chamber 12 (FIG. 3, paragraph [0024]). The particular configuration of the wafer processing apparatus creates a flow pattern of the processing gas over a wafer 74 and toward the exhaust line 22 that promotes even processing over the upper surface of the wafer (Abstract,

paragraphs [0006] and [0007]).

The processing chamber 12 is partially defined by an upper wall 32 (FIG. 3, paragraphs [0005] and [0021]). Additionally, a susceptor 14 is in the processing chamber 12, and a wafer supply opening 40 is formed in one of the chamber walls for transferring a wafer into the chamber 12 and on the susceptor 14 (FIG. 3, paragraph [0021])). A manifold component 18 (FIG. 10) located on the processing chamber 12 together with the upper surface 46 of the upper wall 32 of the processing chamber 12 defines the manifold cavity 60 (FIG. 3, paragraphs [0005] and [0023]).

The upper wall 32 of the processing chamber 12 comprises a plurality of processing gas supply openings 42 (FIG. 3, paragraph [0022]) which provide a pathway for flowing the processing gas from the manifold cavity 60 and into the processing chamber 12, paragraph [0024]. The processing gas supply openings 42 (242 in FIG. 10) are non-uniformly distributed over the upper wall 32 (232 in FIG. 10), paragraph [0007].

VI. GROUNDS OF REJECTIONS TO BE REVIEWED ON APPPEAL

A. Whether claims 29, 42, and 47 are unpatentable under 35 U.S.C. 103(a) over Itsudo et al. (JP05-198512), hereinafter "*Itsudo*," in view of Sivaramakrishnam et al. (U.S. 5,531,183 A), hereinafter "*Sivaramakrishnam*."

B. Whether claim 40 is unpatentable under 35 U.S.C. 103(a) over Itsudo et al. (JP05-198512) and Sivaramakrishnam et al. (U.S. 5,531,183 A) in view of Nguyen (U.S. 6,444,039 B1), hereinafter "*Nguyen*."

VII. ARGUMENT

For the purposes of this reply brief, the claims are argued as a single group.

Group 1: Claims limited to the structural limitations of the processing gas supply line (claims 29, 40, 42, and 47)

Claim Rejections – 35 U.S.C. § 103(a)

Group 1: Claims 29, 40, 42, and 47

Claims 29, 42, and 47 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Itsudo* in view of *Sivaramakrishnam*. Claim 40 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Itsudo* and *Sivaramakrishnam* in view of *Nguyen*.

Appellant claims in part in exemplary claim 29 "**a processing gas supply line connected to the manifold component for providing a processing gas into the manifold cavity, wherein the processing gas comprises reactive gases.**"

It is Appellant's understanding that *Itsudo* discloses a low temperature photo-CVD apparatus which forms a thin film on a substrate. As shown in FIG. 6 of *Itsudo*, the photo-CVD apparatus includes a light source chamber 9 including an inert gas introduction inlet 12, and a light source 11. "**An inert gas introduction system is also connected to the introduction inlet 12**" [0004]. The photo-CVD apparatus of *Itsudo* also includes a separate reaction chamber 21 including the substrate 2 to be processed and a reactant gas inlet 3. The light source chamber 9 and the reaction chamber 21 are divided by a spray plate 8 made of quartz.

As discussed in detail in paragraphs [0002]-[0005] of *Itsudo*, the photo-CVD apparatus of *Itsudo* is designed to have the reaction chamber 21 and light source chamber 9 divided by the spray plate 8 made of quartz in order to prevent reaction products from depositing on the light source 11.

The February 2008 McElray Translation Company translation of *Itsudo* explicitly states that the purpose of the particular configuration is "so that film adhesion on the light source 11 can be prevented" [0005]. Therefore, the reactant gas inlet 3 is deliberately placed in the reaction chamber 21, and the inert gas introduction inlet 12 (which is connected to an inert gas introduction system) is deliberately placed in the light source chamber 9 in order to preserve the quality of light produced and efficiency of the apparatus.

It is Appellant's understanding that *Sivaramakrishnam* discloses a processing apparatus having a distribution nozzle or showerhead 14 attached with a manifold 30 which enters through the top surface of a deposition chamber 10. The manifold 30 is further attached with supply lines 82, 76, 66, 56, 46.

A. *Itsudo* does not disclose a "processing gas supply line" as claimed by Appellant in claims 29, 40, 42, and 47

The Examiner states on page 4 of the Examiner's Answer mailed on February 25, 2008 that *Itsudo* discloses "a processing gas supply line 12; Figure 6) connected to the manifold (9; Figure 6) component for providing a processing gas into the manifold cavity (9; Figure 6) wherein the processing gas comprises reactive gases used for processing the wafer – Claim 29."

Appellant respectfully submits that *Itsudo* in fact does not disclose a "processing gas supply line" as claimed by Appellant in claims 29, 40, 42, and 47. As stated above, *Itsudo* discloses "**an inert gas introduction system**" connected to the inert gas introduction inlet 12. As discussed in more detail below one of ordinary skill in the art would interpret Appellant's "processing gas supply line" as being configured to supply a processing gas comprising reactive gases (i.e. gaseous reactants). *Itsudo's* "inert gas introduction inlet 12" connected to an "inert gas introduction system" fails to meet the claimed limitation.

Accordingly, *Itsudo* fails to disclose or suggest the claimed element of a "processing gas supply line" as claimed by Appellant in claims 29, 40, 42, and 47.

B. The modification of *Itsudo* in view of *Sivarmakrishnam* as proposed by the Examiner is improperly motivated

The Examiner states on page 7 of the Examiner's Answer mailed on February 25, 2008:

> Itsudo does not teach a gas supply line connected via a processing gas supply line opening formed through an upper surface of the manifold cavity.
>
> Sivarmakrishnam teaches a gas supply (40,60,80; Figure 2) connected via a processing gas supply line opening formed through an upper surface (top 10) of a manifold cavity (38).
>
> It would have been obvious to one of ordinary skill in the art at the time the invention was made **to add Sivarmakrishnam's gas supplies** and for Itsudo et al's to optimize the relative location of his processing as supply line opening.
>
> Motivation to add Sivaramakrishnam's gas supplies and for Itsodo's to optimize the relative location of his processing gas supply line opening is to use process gas sources as precursors for operation and to optimize desired process gas flows as taught by Itsudo (abstract). **It is well established that the rearrangement of parts is considered obvious to those of ordinary skill** (emphasis added by Appellant).

Appellant respectfully points out firstly, that *Sivarmakrishnam* does not disclose "a processing gas supply line opening formed through an upper surface (top 10) of a manifold cavity (38)." The upper surface referred to by the Examiner is an upper surface of a deposition chamber 10 and not the manifold 30. Additionally, Appellant respectfully submits that (1) *Itsudo* **teaches away** from the proposed modification and (2) that such a rearrangement of *Itsudo* would **modify the operation** of the device of *Itsudo* and is **not a mere design choice**.

1. The *Itsudo* and *Sivaramakrishnam* references cannot be combined because *Itsudo* teaches away from their combination

"It is improper to combine references where the references teach away from their combination." M.P.E.P. § 2145(X)(D)(2), citing *In re Grasselli*, 713 F2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).

As discussed above the photo-CVD apparatus of *Itsudo* is designed **prevent film adhesion on the light source 11** by deliberately placing the reactant gas inlet 3 in the reaction chamber 21, and deliberately placing the inert gas introduction inlet 12 in the light source chamber 9. An **inert gas introduction system** is connected to the inert gas introduction inlet 12.

The Examiner suggests to "add Sivaramakrishnam's gas supplies" to the light source chamber 9 of *Itsudo*. However, the photo-CVD apparatus of *Itsudo* is specifically designed to prevent reactant gases from migrating into the light source chamber 9 in order to prevent film adhesion on the light source 11. **Therefore, *Itsudo* teaches away from the combination.**

Moreover, Appellant respectfully submits that where *Itsudo* "teaches away" from the proposed combination that according to M.P.E.P. § 2145(X)(D)(1) the relevancy of this teaching be weighed in substance for how it discourages the claimed invention. The teachings of *Itsudo* and *Sivaramakrishnam* are directed toward decidedly different devices with different principal modes of operation. While *Sivaramakrishnam* is entirely void of the effects of reactive process gases inside a manifold cavity, the **teachings of *Itsudo* strongly discourage such a configuration**. Therefore, Appellant respectfully submits that "teaching away" from the claimed invention in *Itsudo* outweighs in substance *Sivaramakrishnam's* silence.

Accordingly, Appellant respectfully submits that because *Itsudo* teaches away from the proposed combination, the proposed combination is not prima facie obvious.

Furthermore, Appellant acknowledges that the Examiner states on page 16 of the Examiner's Answer mailed on February 25, 2008 that the injection of a

"reactant gas" as provided by *Sivarmakrishnam* would not be antithetical to *Itsudo's* goal of preventing the upper wall from deterioration because one of ordinary skill in the art would know well enough to conduct a batch/ semi-batch operation with the modified apparatus. However, Appellant respectfully submits that in supporting such a modification of the device of *Itsudo*, the Examiner is completely ignoring the fact that *Itsudo* expressly teaches away from such a modification.

Accordingly, Appellant respectfully submits that because *Itsudo* teaches away from the proposed combination, the proposed combination is not prima facie obvious.

2. Mere **rearrangement of parts** is not considered obvious to those of ordinary skill in the art when such a rearrangement would **modify the operation** of the device

On page 7 of the Examiner's Answer mailed on February 25, 2008 the Examiner seeks to provide motivation to add *Sivaramakrishnam's* gas supplies to the device of *Istudo* by stating "it is well established that the rearrangement of parts is considered obvious to those of ordinary skill." However, Appellant respectfully submits that a rearrangement of parts is **not considered obvious** when doing so would **modify the operation of the device** or the rearrangement of parts is more than merely a **design choice**. M.P.E.P. § 2144.04(VI)(C). See, for example, *In re Japiske*, 181 F2d 1019, 86 USPQ 70 (CCPA 1950) (claims to a hydraulic power press which read on the prior art except with regard to the position of the starting switch were held unpatentable because the shifting the position of the starting switch would not have modified the operation of the device), and *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975) (the particular placement of a contact in a conductivity measuring device was held to be an obvious matter of design choice).

Contrary to the matters in *Japiske* and *Kuhle*, in the instant case the Examiner is suggesting to modify *Itsudo* to add *Sivaramakrishnam's* gas supplies. Such a modification would substantially modify the operation of the

device of *Itsudo* because the very purpose of the design of the photo-CVD apparatus of Itsudo is to keep reactant gases out of light source chamber 9 and away from the light source 11. Furthermore, the modification is more than a matter of mere design choice.

Accordingly, Appellant respectfully submits that because rearrangement of reactive gas supply line of *Itsudo* would modify the operation of the device and is not merely a design choice, that the proposed rearrangement of parts would not be considered obvious to those of ordinary skill in the art.

C. A "processing gas supply line" is considered a structural limitation

The Examiner argues that the term "processing gas" in the claim limitation "processing gas supply line" is an *intended use* and is therefore not a *structural limitation* in the pending apparatus claims 29, 40, 42, and 47. Thus, the Examiner purports that *any* gas supply line connected to the manifold component satisfies the limitation of a "processing gas supply line."

M.P.E.P § 2114 discusses patentability for apparatus claims including functional language. "A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" **if the prior art apparatus teaches all the structural limitations of the claim**. *Ex parte Masham,* 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)."

Appellant's claims 29, 40, 42, and 47 include both functional and structural language. As described above the processing gas supply line functions to provide a processing gas into the manifold cavity. However, the processing gas supply line must also be configured structurally to perform the function. The Examiner repeatedly states that Appellant's reference to "processing gas" is an intended use of the "processing gas supply line," however this ignores the structural requirement that the processing gas supply line must be configured to supply the processing gas.

Appellant does not claim a level, flow rate, pressure, temperature, etc. of operating the "processing gas supply line." Instead, Appellant distinguishes the

type of supply line as a "processing gas supply line." Accordingly, Appellant's "processing gas supply line" must be configured to provide a processing gas comprising "reactive gases" to the manifold cavity.

Thus, Appellant respectfully submits that the type and configuration of the "processing gas supply line" is considered a structural limitation in the pending apparatus claims 29, 40, 42, and 47.

D. The broadest reasonable interpretation of the term "processing gas" as claimed by Appellant in the phrase "processing gas supply line" necessarily comprises "reactive gases."

The Examiner argues on page 12 of the Examiner's Answer mailed on February 25, 2008 that the "plain meaning" of the term "process gas" is inclusive of both an inert gas and/or a reactive gas. The Examiner further states on page 13 of the Examiner's Answer mailed on February 25, 2008 that:

> [Appellant] thus believes that a "process gas" should only be construed to be a reactive gas. As the Examiner noted above, Appellant's specification as originally filed does not provide such a guidance. And, even if Appellant's specification specifically defined a "process gas" to only be a reactive gas, such a redefinition would not be consistent with a reasonably broad reading of the claims or the prior art's lexicography.

Appellant respectfully disagrees with the Examiner's interpretation of the claim limitation "processing gas" in several significant respects. Firstly, the **broadest reasonable interpretation** of the term "processing gas" as claimed by Appellant **necessarily** comprises "reactive gases." Secondly, prior art lexicography does not dictate (is not authoritative over and does not preempt) Appellant's lexicography of a claim term. Lastly, the term "comprises" is an open-ended claim term, and therefore Appellant does not claim a processing gas includes *only* reactive gases.

During patent examination, the pending claims must be given their **broadest reasonable interpretation** consistent with the specification. M.P.E.P. § 2111. As expressly recognized in the Federal Circuit's en banc decision in *Phillips v. AWH Corp.*, 415 F.3d 1303, 75 USPQ2d 1321 (Fed. Cir. 2005) "The Patent and Trademark office ("PTO") determines the scope of the patent applications not solely on the basis of the claim language, but upon giving claims

their broadest reasonable construction "in light of the specification **as it would be interpreted by one of ordinary skill in the art.**" Citing *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364[,70 USPQ2d 1827] (Fed. Cir. 2004).

In giving the claims their broadest reasonable interpretation "the words of the claim must be given their plain meaning unless **the plain meaning is inconsistent with the specification**. *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)." M.P.E.P. § 2111.01(I). The plain meaning, or alternatively the ordinary and customary meaning given to the term by those of ordinary skill in the art, may be evidenced by a variety of sources, including "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principals, the meaning of technical terms, and the state of the art." *Phillips v. AWH Corp.*, 415 F.3d at 1314, 75 USPQ2d at 1327." Additionally, "where there are several common meanings for a claim term, the patent disclosure serves to **point away** from the improper meanings and **toward** the proper meanings." M.P.E.P. § 2111.01(III) citing *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250, 48 USPQ2d 1117, 1122 (Fed. Cir. 1988). Likewise, an applicant may also be his or her own lexicographer. "The specification should also be relied on for more than just explicit lexicography or clear disavowal of claim scope to determine the meaning of a claim term when applicant acts as his or her own lexicographer; the **meaning of a particular claim term may be defined by implication, that is according to the usage of the term in the context of the specification**." M.P.E.P. § 2111.02(IV).

Accordingly, Appellant respectfully submits that: (1) Several meanings of the technical terms "processing gas" and "reactive gases" are available, and Appellant's specification points away from the improper meanings and toward the proper meaning. (2) Appellant's specification implicitly defines the term "processing gas" as comprising "reactive gases."

1. Several "plain meanings" for the technical terms "processing gas" and "reactive gases" are available, and Appellant's specification points away from the improper meanings and toward the proper meaning

The Examiner states on pages 14-15 of the Examiner's Answer mailed on February 25, 2008:

> Appellant claims "processing gas", which the prior art in general, and a **reasonably broad reading of the claims would find to encompass *all* gases used in the process either inert or reactive.** (bolding and underlining by Appellant)

Appellant respectfully disagrees with the Examiner and submits that the Examiner's interpretation of Appellant's claim term "processing gas" is overly broad, and that the broadest reasonable interpretation of the claim term "processing gas" necessarily comprises reactive gases (i.e. gaseous reactants).

Appellant has also reviewed available semiconductor dictionaries and glossaries for the terms "processing gas" and "reactive gas." SEMATECH defines "**process gas**[1]" as "*in the calibration of mass flow devices*, the principal gas that the user requires the device to control or measure." SEMATECH also defines "**reactivity**[2]" as "the tendency of a substance to undergo chemical reaction, either by itself or with other materials, and to release energy."

Semiconductor Glossary defines "CVD, Chemical Vapor Deposition[3]" as "the most common **thin film deposition** method in advanced semiconductor manufacturing; deposited species are formed as a result of **chemical reaction** between **gaseous reactants** at elevated temperature in the vicinity of the substrate; solid product of the reaction is deposited on the surface of the

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[1] "process gas." *SEMATECH Dictionary of Semiconductor Terms*. 2008. http://www.sematech.org/publications/dictionary/pr_to_pz.htm

[2] "reactivity." *SEMATECH Dictionary of Semiconductor Terms*. 2008. http://www.sematech.org/publications/dictionary/r.htm

[3] "CVD, Chemical Vapor Deposition." *Semiconductor Glossary: An Introduction to Semiconductor Terminology*. 2008. http://www.semiconductorglossary.com/default.asp?searchterm=CVD%2C+Chemical+Vapor+Deposition

substrate; used to **deposit films** of semiconductors (crystalline and non-crystalline), insulators as well as metals." SEMATECH defines "CVD[4]" as "***in semiconductor technology***, a process in which a controlled chemical reaction produces a **thin surface film**."

It is readily apparent that several "plain meanings" for the technical terms are available, and therefore the Examiner is required to consult Appellant's specification to determine if the specification points toward a proper meaning. M.P.E.P. § 2111.01(III).

Appellant's specification describes "A processing gas flows through a gas supply line 320 into a manifold cavity 322" [0002]. Thereafter the remainder of the specification refers to the "processing gas" in shorthand simply as "gas." Furthermore, as described in the specification, Appellant's invention allows for a **uniformly deposited layer on a wafer** by creating a processing gas flow pattern that promotes even processing over the upper surface of the wafer. Thus, the **processing gas** taught and claimed by Appellant is used to **deposit a layer**.

Appellant respectfully submits that ***upon referencing Appellant's specification*** one of ordinary skill in the art would understand that Appellant's apparatus could be, for example, a chemical vapor deposition (CVD) apparatus. Accordingly, the technical term CVD is relevant to interpreting the broadest reasonable interpretation of the claim terms "processing gas" and "reactive gases."

Therefore, when interpreting the plain meaning of the term "processing gas" in accordance with M.P.E.P. § 2111.01(III), it is clear that Appellant's specification points away from the interpretation of the term "processing gas" as supplied by the Examiner, and toward the terms used in the definitions of CVD provided by Semiconductor Glossary and SEMATECH, in which a **processing gas is understood to comprise gaseous reactants that undergo a chemical reaction to form a thin film.**

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[4] "chemical vapor deposition (CVD)." *SEMATECH Dictionary of Semiconductor Terms*. 2008. http://www.sematech.org/publications/dictionary/c_to_ch.htm

2. Appellant's specification **implicitly defines** the term "processing gas" as comprising "reactive gases" (i.e. gaseous reactants).

"[T]he meaning of a particular claim term may be defined by implication, that is according to the usage of the term in the context of the specification." M.P.E.P. § 2111.02(IV).

Appellant's specification describes "A processing gas flows through a gas supply line 320 into a manifold cavity 322." Thereafter the remainder of the specification refers to the "processing gas" in shorthand simply as "gas." Furthermore, as described in the specification, Appellant's invention allows for a uniformly deposited layer on a wafer by creating a processing gas flow pattern that promotes even processing over the upper surface of the wafer. **Thus, the "processing gas" taught and claimed by Appellant *necessarily* comprises "reactive gases" (i.e. gaseous reactants) in order to deposit a layer.**

In summary, Appellant respectfully submits that upon a review of Appellant's specification, that one of ordinary skill in the art would interpret that the broadest reasonable interpretation of the term "processing gas" necessarily includes "reactive gases" in order to deposit a thin film. If Appellant's processing gas did not comprise "reactive gases" then the apparatus could not function to deposit a thin film. Furthermore, Appellant respectfully submits that upon a review of Appellant's specification, that one of ordinary skill in the art would interpret that the broadest reasonable interpretation of the term "reactive gases" as being synonymous with "gaseous reactants" such as those, for example, in a CVD apparatus, as opposed to just any gas having an amount of reactivity.

Furthermore, Appellant acknowledges that the Examiner states on page 25 of the Examiner's Answer mailed on February 25, 2008 that the light source 11 of *Itsudo* can have sufficient power and wavelength to heterolytically cleave even the strong covalent bonds of noble gases, thereby rendering them "reactive." However, again, Applicant respectfully submits that this is an

unreasonable interpretation of Appellant's claim terms "processing gas" and "reactive gases."

For these reasons, Appellant respectfully requests the Examiner adopt and conform his interpretation of the claim terms "processing gas" and "reactive gases" to the definitions described by Appellant in the above sections.

VIII. CONCLUSION

For the reasons stated above and in Appellants Appeal Brief filed on October 10, 2007, claims 29, 42, and 47 are patentable under 35 U.S.C. 103(a) over *Itsudo* in view of *Sivaramakrishnam*, and claim 40 is patentable under 35 U.S.C. 103(a) over *Itsudo* and *Sivaramakrishnam* in view of *Nguyen*.

Appellant respectfully requests that the Board reverse the rejections of the claims 29, 40, 42, and 47 under U.S.C. § 103(a) and direct the Examiner to enter a Notice of Allowance for claims 29, 40, 42, and 47.

Fee For Filing A Brief In Support Of Appeal

Enclosed is a check in the amount of $500.00 to cover the fee for filing a brief in support of an appeal as required under 37 C.F.R. 1.17(c) and 40.20(b)(2). (If a check is not enclosed, you are hereby authorized to charge the deposit account below).

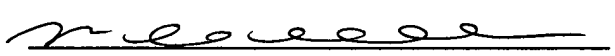
Deposit Account Authorization

Authorization is herby given to charge our Deposit Account No. 02-2666 for any charges that may be due. Furthermore, if an extension is required, then Appellant hereby requests such extension.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Date: April 25, 2008



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APPENDIX A : CLAIMS

Listing of Claims:

1-28 (Canceled)

29. (Previously Presented) A wafer processing apparatus, comprising:

a processing chamber defined by a lower wall, an upper wall and side walls extending from the lower wall to the upper wall, a wafer supply opening being formed in one of the walls for transferring a wafer into the chamber;

a susceptor in the processing chamber on which the wafer can be located so that an upper surface of the wafer faces the upper wall;

a manifold component located on the processing chamber and, together with the upper surface of the upper wall, defining a manifold cavity;

an exhaust line connected to the processing chamber, for flowing an exhaust gas from the processing chamber, connected such that the exhaust gas has a tendency to flow toward the exhaust line; and

a processing gas supply line connected to the manifold component for providing a processing gas into the manifold cavity, wherein the processing gas comprises reactive gases used for processing the wafer, the processing gas supply line connected via a processing gas supply line opening formed through an upper surface of the manifold cavity, wherein the upper wall of the processing chamber comprises a plurality of processing gas supply openings, each of the processing gas supply openings provide an intake opening into an upper surface of the upper wall and an exhaust opening out of a lower surface of the upper wall, to provide a pathway for flowing processing gas from the manifold cavity into the intake openings and out of the exhaust openings of the processing gas openings in the upper wall, and into the processing chamber, the processing gas supply openings being non-uniformly distributed over the upper wall to create a flow pattern comprising a predominantly vertical flow of processing gas onto the wafer.

40. (Previously Presented) The apparatus of claim 29 wherein the processing gas in the manifold cavity comprises non-depleted reactive gases used for processing the wafer.

42. (Previously Presented) A wafer processing apparatus, comprising:

a processing chamber defined by a lower wall, an upper wall and side walls extending from the lower wall to the upper wall;

a susceptor in the processing chamber on which the wafer can be located so that an upper surface of the wafer faces the upper wall;

a manifold component located on the processing chamber and, together with the upper surface of the upper wall, defining a manifold cavity;

an exhaust system comprising an exhaust line connected to the processing chamber, for flowing an exhaust gas from the processing chamber;

a processing gas supply line connected to the manifold component;

a plurality of processing gas supply openings distributed non-uniformly in the upper wall providing a means for supplying a processing gas from the manifold cavity to the processing chamber, wherein the processing gas comprises non-depleted reactive gases used for processing the wafer, wherein the exhaust gas comprises reacted gases and depleted processing gas, wherein the processing gas supply openings are non-uniformly distributed over the upper wall, wherein the processing gas supply openings, the manifold cavity and component, processing gas supply, and exhaust system predominantly determine the flow pattern of processing gas onto the upper surface of the wafer.

47. (Previously Presented) A wafer processing apparatus, comprising:

a processing chamber defined by a lower wall, an upper wall and side walls extending from the lower wall to the upper wall;

a susceptor in the processing chamber on which the wafer can be located so that an upper surface of the wafer faces the upper wall;

a manifold component located on the processing chamber and, together with the upper surface of the upper wall, defining a manifold cavity;

a processing gas supply line connected to the manifold component;

a plurality of processing gas supply openings in the upper wall, wherein a processing gas from the manifold cavity passes into the processing chamber, wherein the processing gas comprises reactive gases used for processing the wafer, wherein the processing gas supply openings are non-uniformly distributed over the upper wall; and

an exhaust system comprising an exhaust line connected to the processing chamber, for flowing an exhaust gas from the processing chamber, wherein the exhaust gas comprises reacted gases and depleted processing gas.

APPENDIX B: EVIDENCE

NONE

APPENDIX C: RELATED PROCEEDINGS

NONE